IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of:	)	PATENT
KELLER et al.	)	
	)	Examiner: C. D. Sayala
Serial No.: 10/816,850	)	
	)	Art Unit: 1761
Filed: April 5, 2004	)	
	)	Atty. Docket No.: 119544-00101
For: ENVIRONMENTALLY FRIENDLY GRANULATED POULTRY LITTER FERTILIZER	)	Customer No. 27557

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sirs:

The present Appeal Brief is submitted further to the Notice of Appeal filed September 4, 2007.

I. REAL PARTY IN INTEREST (37 C.F.R. § 41.37(c)(1)(i))

The joint inventors, Mr. William W. Keller and Ms. Lyn Kelley (hereinafter "Applicants-Appellants"), having not assigned nor transferred any of their rights, titles, and/or interests in the present patent application or invention disclosed therein. Accordingly, they are the real parties in interest.

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. § 41.37(c)(1)(ii))

There are no other related appeals or interferences known to Appellants or Appellants' legal representatives, which would directly affect or be directly affected by or have a bearing on the Board's decision in the present pending appeal.

III. STATUS OF CLAIMS (37 C.F.R. § 41.37(c)(1)(iii))

Claims 1-3, 5-14, and 16-20 are pending in the present application (see the Claims Appendix, containing a listing of the pending claims, which include all previous amendments entered in the record). Claims 1-3, 5-14, and 16-20 stand rejected and form the subject matter of the present appeal.

In the most recent Office Action mailed on March 1, 2007,

- Claims 1-3, 5-9, 14, and 16-20 were and stand rejected under 35 U.S.C. § 102(b) as allegedly being inherently anticipated by EP 474992;
- Claims 1, 3, 8, 9, 14, and 20 were and stand rejected under 35 U.S.C. § 102(b) as allegedly being inherently anticipated by U.S. Patent No. 6,726,941 to *Ethington Jr. et al.* (hereinafter "the '941 patent"); and
- Claims 1, 2, 8-13, 19, and 20 were and stand rejected under 35 U.S.C. § 102(b) as allegedly being inherently anticipated by U.S. Patent No. 6,461,399 to *Connell* (hereinafter "the '399 patent").

IV. STATUS OF AMENDMENTS (37 C.F.R. § 41.37(c)(1)(iv))

No amendment was filed subsequent to the final rejection of July 19, 2007.

V. SUMMARY OF CLAIMED SUBJECT MATTER (37 C.F.R. § 41.37(c)(1)(v))

The disclosed invention relates to a poultry litter-based fertilizer composition and method of making the same. In particular, the fertilizer of the disclosed invention has an acceptable odor, relatively high nitrogen content, and relatively low phosphorus content (both nitrogen and phosphorus are potentially harmful to surface waters, but phosphorus in particular is known to causes adverse affects on the environment).

The claimed fertilizer composition includes at least poultry litter, calcium carbonate, and a binding agent in certain amounts. Preferably, the fertilizer contains about 20-70% by weight of poultry litter, about 20-70% by weight of calcium carbonate, and about 2-8% by weight of the binding agent. It was found that the calcium carbonate is effective in removing odor as well as reducing phosphate levels. The fertilizer composition preferably has a total nitrogen content of about 1-2.5% and a phosphorus content of about 0.35%. The fertilizer composition preferably has a phosphorus content about 25% that of the raw poultry litter.

Independent claim 1, as amended, recites the following (see the as-filed patent application specification, pages 3 and 7, and Table I, for support):

> 1. A fertilizer comprising poultry litter, calcium carbonate, and a binding agent, wherein the total nitrogen content is about 1-2.5% and the phosphorus content is about 0.35%.

Independent claim 9, as amended, recites the following (see the as-filed application, pages 3-7, Table I, and FIG. 1, for support):

> 9. A method for making fertilizer comprising the step of mixing poultry litter, calcium carbonate, and a binder, wherein the total nitrogen content is about 1-2.5% and the phosphorus content is about 0.35%.

Independent claim 20, recites the following (see the as-filed application, pages 3 and 7, and Table I, for support):

> 20. A fertilizer comprising poultry litter, calcium carbonate, and a binding agent, wherein the phosphorus content of the fertilizer is about 25% that of the raw poultry litter.

In terms of construing those claims, all three claims are directed to a fertilizer composition that may include more than just the three recited ingredients. Claims 1 and 9 require that the claimed nitrogen content fall within a range of about 1-2.5%, and the claimed phosphorus content be limited to about 0.35%. Those amounts are relative to the fertilizer, not just the three recited components. Thus, other unclaimed ingredients that are added to the fertilizer may contribute to the claimed nitrogen and phosphorus content. Claim 20 requires that the claimed phosphorus content of the fertilizer be limited to about 25% of the phosphorus in the feed or raw poultry litter.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL (37 C.F.R. § 41.37(c)(1)(vi))

- Whether independent claims 1, 9, and 20 are inherently anticipated by EP 474992, the '941 patent, and/or the '399 patent; and

- Whether dependent claims 2, 3, 5-8, 10-14, and 16-19 are inherently anticipated by EP 474992, the '941 patent, and/or the '399 patent.

VII. ARGUMENT (37 C.F.R. § 41.37(c)(1)(vii))

A. Summary of Argument

A *prima facie* case of anticipation has not been established with respect to the pending claims because all of the claim limitations of independent claims 1, 9 and 20, and dependent claims 2, 3, 5-8, 10-14, and 16-19, are not identically found in the cited prior art references, the rejections are based upon improper hindsight reasoning, and on inaccurate assumptions about the nature of the invention.

B. Summary of Rejections

With regard to the rejections of claims 1-3, 5-9, 14, and 16-20 based on EP 474992, the Examiner contends that the reference "teaches adding lignosulfonate and calcium carbonate to poultry manure to obtain a fertilizer." The Examiner states that EP 474992 discloses 30-60% manure, 1-20% lignosulfonate, and 0-40% limestone, and that the phosphate content in the final product is given as 0-20%. With regard to the claimed feature "wherein the total nitrogen content is about 1-2.5% and the phosphorus content is about 0.35%" and "wherein the phosphorus content of the fertilizer is about 25% that of the raw poultry litter," the Examiner contends that those features "would have been inherent in the final product, because the amount of poultry manure, limestone, and binder fall within the same range and therefore, the phosphate

content and the nitrogen content must be the same in the final product." *See* Office Action of March 1, 2007, at 3.

With regard to the rejection of claims 1, 3, 8, 9, 14, and 20 based on the '941 patent, the Examiner contends that the reference "shows mixing dried poultry waste, lignosulfonate and dolomitic limestone. See claims 3, 29; col. 9, lines 35+, col. 18, line 47, col. 19, line 23." With regard to the claimed feature "wherein the total nitrogen content is about 1-2.5% and the phosphorus content is about 0.35%" and "wherein the phosphorus content of the fertilizer is about 25% that of the raw poultry litter," the Examiner contends that those features "would have been inherent, because the reference is doing the same thing that the claims herein recite, which is to combine limestone and binder with the same poultry manure must be the same in the end product." *See id.*

With regard to the rejection of claims 1, 2, 8-13, 19, and 20 based on the '399 patent, the Examiner contends that the reference "teaches using poultry manure (col. 4, line 60), treating it with calcium carbonate (col. 4, lines 5 and 8), and grinding and blending the two. Col. 4, lines 38-40. A binder, lignin sulfonate is also used to make a prilled product (col. 7, lines 37-65)." The Examiner states that figures 2 and 3 of the '399 patent show a raw product being fed into a drier to reduce the moisture content (col. 7, lines 41-43), and that the reference discloses a screening step at col. 8, line 10+. The Examiner further states that the '399 patent discloses that dolomitic limestone is the most common form available and used (col. 4, lines 10-20). With regard to the claimed feature "wherein the total nitrogen content is about 1-2.5% and the phosphorus content is about 0.35%" and "wherein the phosphorus content of the fertilizer is about 25% that of the raw poultry litter," the Examiner contends that those features "would have

been inherent, because the reactants are the same, which is, mixing poultry manure, limestone and binder together and therefore would result in the same." *See id.* at 4.

C. Applicable Law

A rejection for anticipation under 35 U.S.C. § 102 requires that each and every limitation of the claimed invention be disclosed in a single prior art reference. *In re Buszard*, 84 U.S.P.Q.2d 1749, 1750 (Fed. Cir. 2007) (citations omitted). Although the absence from the prior art reference of any claimed element negates anticipation, *see Rowe v. Dror*, 42 U.S.P.Q.2d 1550, 1553 (Fed. Cir. 1997), "a prior art reference may anticipate without disclosing a feature of the claimed invention if that missing characteristic is necessarily present, or inherent, in the single anticipating reference." *Schering Corp. v. Geneva Pharms., Inc.*, 67 U.S.P.Q.2d 1664 (Fed. Cir. 2003) (citing *Continental Can Co. v. Monsanto Co.*, 20 U.S.P.Q.2d 1746 (Fed. Cir. 1991)). Resort to extrinsic evidence to show what is or is not inherently disclosed in the prior "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 49 U.S.P.Q.2d 1949, 1950-1951 (Fed. Cir. 1999) (citations omitted).

According to MPEP Sec. 2112, an "Examiner must provide rationale or evidence tending to show inherency." To rely on inherency, "the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent

characteristic necessarily flows from the teachings of the applied art." *Ex parte Levy*, 17 U.S.P.Q.2d 1461 (Bd. Pat. App. & Inter. 1990) (emphasis in original).

D. It was Error to Reject Claims 1, 9 and 20 as Being Inherently Anticipated by EP 474992, the '941 patent, and/or the '399 patent

In the Office Action, the Examiner alleges that the claimed nitrogen and phosphorus content "would have been inherent in the final product [disclosed in the cited references], because the amount of poultry manure, limestone, and binder fall within the same range and therefore, the phosphate content and the nitrogen content must be the same in the final product." *See* Office Action of March 1, 2007, at 2-3. The Examiner further alleges that the claimed nitrogen and phosphorus content "would have been inherent, because the ['941 patent] reference is doing the same thing that the claims herein recite, which is to combine limestone and binder with the same poultry manure must be the same in the end product." *See id.* at 3. The Examiner further alleges that the claimed nitrogen and phosphorus content "would have been inherent, because the reactants [in the '399 patent] are the same, which is, mixing poultry manure, limestone and binder together and therefore would result in the same." *See id.*

The Examiner's inherency arguments are each based in part on a belief that the present specification "reveals that applicant achieves this [lowering of the phosphate content and high nitrogen content] by combining calcium carbonate, a binder and poultry manure. Since the reference [sic] combines the same, then the same result ensues" (emphasis added). *See id.* at 4. The Examiner then states that the claimed relatively low phosphorus content and high nitrogen content "would flow naturally from the teaching of the prior art." Thus, it appears that the Examiner's

inherency argument is based on the prior art teaching of the same basic ingredients claimed in the present application, and the prior art teaching that those ingredients can be mixed together.

It was error to rejection claims 1, 9, and 20 as being inherently anticipated by EP 474992, the '941 patent, and/or the '399 patent because (1) the cited references do not teach a fertilizer "wherein the total nitrogen content is about 1-2.5% and the phosphorus content is about 0.35%" and "wherein the phosphorus content of the fertilizer is about 25% that of the raw poultry litter," and (2) the claimed nitrogen and phosphorus content and phosphorus reduction do not naturally flow from the prior art combination of poultry manure, calcium carbonate, and binders simply because the prior art combines those three ingredients.

(1) It is undisputed that the prior art does not explicitly disclose "wherein the total nitrogen content is about 1-2.5% and the phosphorus content is about 0.35%," as recited in claims 1 and 9, and "wherein the phosphorus content of the fertilizer is about 25% that of the raw poultry litter," as recited in claim 20

Consider the EP 474992 disclosure for example, which discusses, in the English-language Abstract (the entire German-language reference was apparently not relied upon by the Examiner), a fertilizer containing manure, limestone, and lignosulfonate, and a final fertilizer content of 0-20% (weight) of phosphates:

> The invention relates to a process for treating manure, in which the thixotropic properties of the manure are modified by addition of calcium or magnesium lignosulphonate containing hemicelluloses and sugar and the manure prepared in this way and partially deodorised is applied in several aliquots to an organic or inorganic absorbent which is thoroughly mixed and aerated between the individual aliquot additions. After applying the desired amount of manure, the resulting mixture is enriched with substances

> favourably influencing plant growth, and this mixture is used as a controlled-release fertiliser, consisting of (by weight) 10 to 50 parts of shredded waste based on plant biomass, 30 to 60 parts of manure prepared using 1 to 20 parts of calcium or magnesium lignosulphonate, 0 to 40 parts of limestone, 0 to 20 parts of ammonium sulphate and 0 to 20 parts of phosphates.

That excerpt from EP 474992 does not disclose a mixture of poultry litter, calcium carbonate, and a binder having the final claimed ratio of nitrogen and phosphorus, as recited in claims 1 and 9, nor the claimed amount of phosphorus reduction, as recited in claim 20. In fact, the above Abstract is silent with regard to the elemental nitrogen and phosphorus content of the fertilizer and reduction of phosphorus.

Similarly, the '941 patent, which discloses an amorphous solid cast feed product having a condensed and mold-solidified substantially liquid agricultural byproduct (*see* claim 1 of the '941 patent) that may be optionally combined with one or more of an exogenous nitrogen source, recycled animal waste products (e.g., poultry waste), stabilizers (*see* specification under "Materials"), and minerals such as limestone, does not appear to disclose the claimed final concentration of nitrogen and phosphorus or reduction of phosphorus in the present application.

Moreover, the '399 patent discloses an organic-based uniprill fertilizer made from an organic matter that is sequentially pre-treated by first mixing it in a first grinder with a lime admixture, then adding a slurry of reagents and binders, followed by a mixture of acids (*see* Abstract; FIGS. 1-3). The organic matter is disclosed as including chicken manure. Lime is calcium carbonate. Nitrogen is added as a slurry of reagents (*see* FIG. 1). The '399 patent does not disclose specific ratios of ingredients like in '941 patent; rather, it states that "the relative ratio of each component is based upon the desired end product formulation, as prescribed for a

specific soil and crop need" (col. 4, line 66, to col. 5, line 1). The '399 patent does not appear to disclose specific final concentrations of nitrogen and phosphorus in the fertilizer, or a reduction of the amount of phosphorus in the initial chicken manure.

Accordingly, the question of anticipation of the claims reduces to whether the cited prior art references inherently disclose the relative quantities of nitrogen and phosphorus in a final fertilizer product, and the amount of phosphorus reduction between the feed and the final formulation. Despite the Examiner's contentions, the cited prior art fails to inherently show the claimed nitrogen and phosphorus content and phosphorus reduction and they do not necessarily flow from the teachings of the cited references.

(2) The Examiner's Allegation of Inherency is Erroneous Because it is Based on an Incorrect Assumption that the Claimed Formulation is Like the Prior Art Formulation

It is well known that an inventor may discover something that already existed before. "That the thing was there, undiscovered, does not render it 'inherently anticipated.'" *Schering Corp. v. Geneva Pharmaceuticals Inc.*, 68 U.S.P.Q.2d 1760, 1761 (Fed. Cir. 2003). Thus, the mere fact that the cited prior art disclose using poultry waste, calcium carbonate, and a binder does not, in and of itself, establish that the prior art also inherently discloses a fertilizer compositions having the claimed nitrogen and phosphate content.

For instance, the Examiner contends that because the amount of manure, limestone, and lignosulfonate disclosed in EP 474992 (i.e., 30-60% manure, 0-40% limestone, and 1-20% lignosulphonate) falls within the same preferred ranges of ingredients disclosed in the present application (i.e., 20-70% by weight of poultry litter, about 20-70% by weight of calcium

carbonate, and about 2-8% by weight of the binding agent), it stands to follow that the amount of nitrogen and phosphorus in the prior art formulation is the same as the claimed formulation.

However, claims 1, 9 and 20 are not limited to the preferred ranges of the three components disclosed in the specification and relied upon by the Examiner. The claims are broad enough to cover many different formulations of the three ingredients, which may or may not fall within the ranges specified in EP 474992 and other prior art. The Examiner does not contend that any formulation will have the claimed nitrogen and phosphorus content, just those that fall within the disclosed preferred ranges, which suggests that EP 474992 inherently anticipates only some of the time, which does not make sense.

It is submitted that Applicants'-Appellants' own disclosure of preferred ranges of ingredients is being relied upon by the Examiner to look back in time for similar disclosures and then make a conclusion regarding inherency. This quintessentially hindsight retooling of the prior art to arrive at the claimed invention is improper. *In re Schreiber*, 44 U.S.P.Q.2d 1429, 1434 (Fed. Cir. 1997) (rejecting a Board's use of an invention as a template to rescale the prior art and arrive at the claimed invention because it was "an exercise of hindsight that does not support a finding of anticipation"; and also noting that "[a] prior art device can not be altered by the Board and then found to anticipate a different invention in whose image it was recreated."). In the absence of Applicants'-Appellants' own disclosure, the Examiner's inherency argument based on EP 474992 cannot be sustained.

The Examiner makes essentially the same incorrect assumptions about the composition of claims 1, 9, and 20 when rejecting the claims based on the '941 patent. The Examiner contends that "because the reference is doing the same thing that the claims herein recite, which is to

combine limestone and binder with the same poultry manure [the content of nitrogen and phosphorus] must be the same in the end product." *See* Office Action at 3. Here again, rather than starting with the prior art and assessing what that art explicitly or inherently discloses, the Examiner relies on the Applicants'-Appellants' own disclosure as a roadmap for reaching back in time to find prior art that must, in the eyes of the Examiner, inherently disclose the claimed invention.

(3) The Examiner's Conclusions About Inherency Are Unsupportable Because They Incorrectly Assume That the Prior Art Formulation Methods Are the Same as the Disclosed Methods and Would Achieve the Same Final Nitrogen and Phosphorus Content

As noted previously, the Examiner contends that the nitrogen and phosphorus content and phosphorus reduction in the formulations disclosed in the cited prior art "would have been inherent in the final product [of the EP 474992], because the amount of poultry manure, limestone, and binder fall within the same range and therefore, the phosphate content and the nitrogen content must be the same in the final product." *See* Office Action of March 1,2007, at 2-3. The Examiner further contends that the claimed nitrogen and phosphorus content and phosphorus reduction "would have been inherent, because the ['941 patent] reference is doing the same thing that the claims herein recite, which is to combine limestone and binder with the same poultry manure must be the same in the end product." *See id.* at 3. Finally, the Examiner contends that the feature "would have been inherent [in the '399 patent], because the reactants are the same, which is, mixing poultry manure, limestone and binder together and therefore would result in the same."

The above inherency arguments focus on the way in which the formulations of claims 1 and 20 are made, not on the claimed formulations themselves. *Rosco Inc. v. Mirror Lite Co.*, 64 U.S.P.Q.2d 1676, 1680 (Fed. Cir. 2002) (noting that the inherency question is not whether the manufacture of a mirror using a disclosed process inherently results in a claimed varying radius of curvature along the major axis of the mirror, but whether one skilled in the art would read the prior art patent as inherently disclosing the invention of the later patent, that is, whether one skilled in the art would read the prior art patent as showing a mirror of varying radius of curvature along the major axis) (emphasis added). Nevertheless, even if we address the inherent disclosure of the prior art with regard to the methods of making formulations like those in claims 1 and 20, the Examiner still overlooked the fact that the initial and final content of nitrogen and phosphorus in a formulation is not the same in the present invention, and ignored the fact that the prior art teach using other ingredients, any one of which may be contributing to the nitrogen and/or phosphorus content of the final prior art products.

It is well known to those of ordinary skill in the art that the nitrogen content of raw poultry litter is in the form of ammonia that evaporates during processing of the raw litter in an open system. As such, the nitrogen content of raw poultry litter cannot be the same as that of the final product after processing. To support Applicants'-Appellants' assertion that the initial nitrogen and phosphorus content are not the same in the final fertilizer product and the initial poultry litter, Applicants-Appellants submitted two references to the Patent Office as part of a Pre-Appeal Brief Request for Review filed September 6, 2006. *Continental Can Co. v. Monsanto Co.*, 20 U.S.P.Q.2d 1746 (Fed. Cir. 1991) (allowing the use of extrinsic evidence to assess prior art references as part of an inherency analysis). The references, which are enclosed herewith in the Evidence Appendix, are

The Value and Use of Poultry Waste as Fertilizer by Charles C. Mitchell, Jr. ("Mitchell reference"), and *Manure as Fertilizer* by Pete Christensen and Bill Peacock ("Christensen reference"). Those references show that the nutrient contents of manure products depend of how the raw manure is processed. The Mitchell reference specifically states:

> The chemical analysis of either type of manure is highly variable due to several factors. These include moisture, temperature, amount and kind of litter, amount of soil picked up in cleaning a house, the number of batches of broilers fed on the litter, and the conditions under which the manure was stored and handled before spreading.

Michell reference, 8th paragraph (emphasis added). Likewise, the Christensen reference states:

> Actual nutrient content of manures varies depending on source, ..., moisture content, storage, and handling methods.

Christensen reference, 2nd paragraph (emphasis added).

In addition, Applicants-Appellants submitted to the Patent Office a Declaration of Frederic T. Heasley showing that nitrogen content of the raw poultry litter is much higher than that of the final fertilizer product because of ammonia evaporation during processing. The Declaration, which is enclosed herewith in the Evidence Appendix, clearly contradicts the Examiner's allegation that the nitrogen content of the raw litter is the same as the nitrogen content of the final fertilizer product. Thus, one cannot rely on the fact that just because the prior art teaches the same formulation—i.e., poultry litter, calcium carbonate, and a binder—as the claimed invention it must

also disclose the same final concentration of nitrogen and phosphorus, or phosphorus removal. Clearly, the steps involved in processing the ingredients will affect the final product characteristics.

Moreover, the Examiner's inherency argument does not account for the fact that the cited prior art references do not contain the same reactants as the present invention, and so whatever nitrogen and phosphorus is inherently disclosed may have been contributed to the final prior art formulations from other ingredients, often undefined, that are added during the manufacturing process.

EP 474992, for example, teaches combining manure, calcium or magnesium lignosulphonate, sugar, and a deodorizer, which mixture is then applied in several aliquots to an organic or inorganic absorbent which is thoroughly mixed and aerated between the individual aliquot additions. "After applying the desired amount of manure, the resulting mixture is enriched with substances favorably influencing plant growth, and this mixture is used as a controlled-release fertilizer, consisting of...0 to 20 parts of phosphates." What is key to that reference is the use of absorbents and the addition of substances to "enrich" the mixture to favorably influence plant growth, which those skilled in the art would understand could include nitrogen- or phosphorus-containing substances.

Additionally, EP 474992 teaches the use of 0-40% limestone (calcium carbonate), which means that limestone is not a required component of the final composition if one skilled in the art elects to use 0%. This is inapposite to the present invention where calcium carbonate is a required component. As such, the examiner's conclusion that the "amount of poultry manure, limestone and binder falls within the same range and therefore, the phosphate content and the nitrogen content must be the same in the final product" (*See* Office Action of March 1, 2007, at

5) is erroneous, because one skilled in the art following the teaching of EP 474992 could use 0% limestone, which would not result in the final nitrogen and phosphorus contents claimed by the present invention.

Thus, one of ordinary skill in the art would not necessarily understand that the nitrogen and phosphorus is contributed solely by the manure, or whether it came from the combination of the manure and the absorbent or the "enriching" material. Even if the untranslated portions of the EP 474992 reference do teach what the Examiner contends they do, the mere fact that a certain thing may result from a given set of circumstances is not sufficient. *Trintec Indus., Inc. v. Top-U.S.A. Corp.*, 63 U.S.P.Q.2d 1597, 1599 (Fed. Cir. 2002) (quoting *In re Robertson*, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999)) ("Inherent anticipation requires that the missing descriptive material is 'necessarily present,' not merely probably or possibly present, in the prior art."). To conclude that all of the various combinations of the disclosed (and optional) ingredients is necessarily a disclosure of a final product having the exact same claimed concentration of nitrogen and phosphorus or phosphorus removal as recited in the present claims is simply conjecture. *See generally Glaxo Group Ltd. v. Apotex Inc.*, 71 U.S.P.Q.2d 1801 (Fed. Cir. 2004) (finding no inherent disclosure of a polymorphic form of ranitidine hydrochloride by a prior art method of making ranitidine hydrochloride where two out of thirteen experiments yielded a different polymorphic form).

Similarly, the '941 patent teaches making "An amorphous solid cast feed product formed by a process comprising: condensing a substantially liquid agricultural byproduct; and solidifying the condensed substantially liquid agricultural byproduct in a mold...." (*see* claim 30). The product is further defined by "blending an exogenous nitrogen source, a vitamin, a

mineral, a sulfonated lignin material, a recycled animal waste product, or any combination thereof with said exogenous fat, exogenous carbohydrate, and substantially liquid agricultural byproduct" (*see* claim 36). It is believed that the "condensing" procedure taught by the '941 patent would reduce the amount of volatilization of nitrogen in the manure, and the addition of "exogenous nitrogen" would further affect the final nitrogen concentration. Thus, one of ordinary skill in the art cannot tell from the '941 patent what the final concentration of nitrogen and phosphorus will be from that disclosure without knowing how much is being added and lost during manufacturing, and whether the amount is contributed by the "agricultural byproduct," a binder, or from other ingredients. Again, it would be conjecture to assume that the various formulations would inherently disclose the concentration of nitrogen and phosphorus and phosphorus removal as recited in the present claims.

Moreover, the '399 patent teaches a formulation and method of making the same that is not the same as that disclosed in the present application. Thus, one of ordinary skill in the art cannot tell from the '399 patent what the final concentration of nitrogen and phosphorus will be in the disclosed product.

Applicants-Appellants respectfully submit the following cases are relevant to the present issues on Appeal. First, in *Atofina v. Great Lakes Chemical Corp.*, 78 U.S.P.Q.2d 1417, 1424 (Fed. Cir. 2006), the Federal Circuit found that a district court clearly erred in finding that the prior art inherently disclosed the contact times found in claims 6 and 10 of the patent-in-suit, which required that the "gas phase mixture of methylene chloride, anhydrous hydrogen fluoride and oxygen is in contact with the catalyst for a time between 0.01 and 10 seconds." In doing so, the Federal Circuit found that the contact times were not expressly found in the prior art

reference, and that the defendant's calculations of contact times did not establish inherent disclosure because they were based on examples in the prior art reference that stated the diameters and lengths of reaction tubes and the flow rates, but did not say anything about any contact times. *Id.* "Because anticipation by inherent disclosure is appropriate only when the reference discloses prior art that must necessarily include the unstated limitation, [the prior art reference] cannot inherently anticipate the claims of the [patent-in-suit]." *Id.*

In *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303 (Fed. Cir. 1983), the Federal Circuit found that a district court erred in finding that the prior art Smith reference inherently disclosed "porous" products having a "microstructure characterized by nodes interconnected by fibrils" as required by the claims found to have been anticipated, and it erred in finding that the prior art Sumitomo reference inherently disclosed products having "a matrix tensile strength...above about 7,300 psi" as required by the claims found to have been anticipated. *Id.* at 313. In doing so, the Federal Circuit stated that due to the unique nature of the claimed PTFE, "we are not persuaded that the 'effect' of the processes disclosed in Smith and Sumitomo, an 'effect' undisclosed in those patents, would be always to inherently produce or be seen always to produce products meeting all of the claim limitations. Anticipation of inventions set forth in product claims cannot be predicated on mere conjecture respecting the characteristics of products that might result from the practice of processes disclosed in references." *Id.* at 314 (citations omitted).

E. It was Error to Reject Claims 2, 3, 5-8, 10-14, and 16-19 as Being Inherently Anticipated by EP 474992, the '941 patent, and/or the '399 patent

Claims 2, 3, 5-8, 10-14, and 16-19 do not stand or fall with the claims from which they depend, because they recite additional features not found in the independent claims. It is submitted that the cited prior art references do not, contrary to the Examiner's contentions, disclose every feature recited in claims 2, 3, 5-8, 10-14, and 16-19, either explicitly or inherently, for the same reasons set forth above with regard to claims 1, 9 and 20.

VIII. CLAIMS APPENDIX (37 C.F.R. § 41.37(c)(1)(viii))

Attached hereto is a listing of the claims pending in the application, as amended.

IX. EVIDENCE APPENDIX (37 C.F.R. § 41.37(c)(1)(ix))

Enclosed herewith is a copy of the Declaration of Frederic T. Heasley that was submitted to the Patent Office on January 10, 2007, pursuant to 37 C.F.R. § 1.132, and is being relied upon by Applicants-Appellants in this appeal. The Office Action mailed February 22, 2007, includes comments from the Examiner acknowledging the Declaration. Accordingly, it is submitted that the Declaration is part of the record of the present application.

Also enclosed herewith is a copy of The Value and Use of Poultry Waste as Fertilizer by Charles C. Mitchell, Jr. ("Mitchell reference"), and Manure as Fertilizer by Pete Christensen and Bill Peacock ("Christensen reference"), that were submitted to the Patent Office on September 6, 2006, as part of a Pre-Appeal Brief. The Office Action mailed October 10, 2006, contains an

acknowledgement from a panel of examiners that the Brief was considered. Accordingly, it is submitted that the two references are part of the record of the present application.

X. RELATED PROCEEDINGS APPENDIX (37 C.F.R. § 41.37(c)(1)(x))

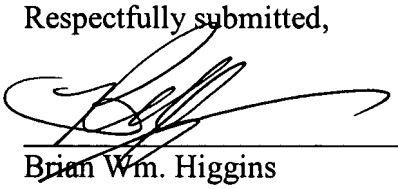
There are no decisions rendered by a court or the Board in any proceeding identified pursuant to Section II above.

XI. CONCLUSION

It is respectfully submitted that the rejections of the claims as being inherently anticipated by the cited prior art are without merit, because they are based on certain assumptions that would ultimately lead one of ordinary skill to conclude that the prior art at best possibly, but not definitively, discloses the nitrogen and phosphorus content and phosphorus reduction recited in the present claims. However, the mere possibility that the references disclose the claimed nitrogen and phosphorus content and phosphorus reduction is not enough to sustain the present rejections under 35 U.S.C. § 102. *In re Robertson*, 49 U.S.P.Q.2d 1949, 1951 (Fed. Cir. 1999). ("does not embrace probabilities or possibilities."). Applicants-Appellants request that the Board reverse the Examiner's rejections as noted above and instruct the Examiner to confirm the patentability of the rejected claims and issue a notice of allowability.

The Commissioner is hereby authorized to charge any additional fees due or any overpayment of fees to Deposit Account No. 23-2185 (119544-00101).

Respectfully submitted,



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Date: December 4, 2007

CLAIMS APPENDIX

(37 C.F.R. § 41.37(c)(1)(viii)

LISTING OF THE CLAIMS

Claim 1 (currently amended): A fertilizer comprising poultry litter, calcium carbonate, and a binding agent, wherein the total nitrogen content is about 1-2.5% and the phosphorus content is about 0.35%.

Claim 2 (Original): The fertilizer of claim 1, wherein the fertilizer is in the form of pellets or granules.

Claim 3 (original): The fertilizer of claim 1, wherein the binding agent is calcium lignosulfonate.

Claim 4: Cancelled.

Claim 5 (Original): The fertilizer of claim 1, wherein the calcium carbonate is present in an amount of about 20-70%.

Claim 6 (Original): The fertilizer of claim 1, wherein the binder is present in an amount of about 2-8%.

Claim 7 (Original): The fertilizer of claim 1, wherein the poultry litter is present in an amount of about 20-70%.

Claim 8 (Original): The fertilizer of claim 1, wherein the calcium carbonate is dolomitic limestone.

Claim 9 (Currently amended): A method for making fertilizer comprising the step of mixing poultry litter, calcium carbonate, and a binder, wherein the total nitrogen content is about 1-2.5% and the phosphorus content is about 0.35%.

Claim 10 (Original): The method of claim 9, further comprising the step of drying the fertilizer.

Claim 11 (Original): The method of claim 9, wherein the poultry litter is grounded before mixing.

Claim 12 (Original): The method of claim 9, wherein the fertilizer is in the form of pellets or granules.

Claim 13 (Original): The method of claim 12, further comprising the step of screening the fertilizer to separate the pellet size.

Claim 14 (Original): The method of claim 9, wherein the binding agent is calcium lignosulfonate.

Claim 15: Cancelled

Claim 16 (Original): The method of claim 9, wherein the calcium carbonate is present in an amount of about 20-70%.

Claim 17 (Original): The method of claim 9, wherein the binder is present in an amount of about 2-8%.

Claim 18 (Original): The method of claim 9, wherein the poultry litter is present in an amount of about 20-70%.

Claim 19 (Original): The method of claim 9, wherein the calcium carbonate is dolomitic limestone.

Claim 20 (Previously presented): A fertilizer comprising poultry litter, calcium carbonate, and a binding agent, wherein the phosphorus content of the fertilizer is about 25% that of the raw poultry litter.

EVIDENCE APPENDIX

(37 C.F.R. § 41.37(c)(1)(ix)

THE VALUE AND USE OF POULTRY WASTE AS FERTILIZER.

Agriculture & Natural Resources Agronomy
Alabama Cooperative Extension Service, Auburn University, Alabama
36849-5612

Charles C. Mitchell, Jr., Extension Agronomist
James O. Donald, Extension Agricultural Engineer
John Martin, Consulting Agronomist

The Alabama poultry industry (broilers and layers) produces more than 735 million birds a year. These birds produce about 1.7 million tons of manure and litter.

The nutrients in this manure could adequately fertilize every acre of corn, cotton, wheat, and sorghum produced in Alabama or 800,000 acres of bermuda or fescue pasture.* In fact, the nitrogen (N), phosphate (p2o5), and potash (K2o) in poultry manure represent about 40 percent of the N, 90 percent of the P2O5, and 40 percent of the K2O spread each year in commercial fertilizers in Alabama.

Poultry manure, if properly handled, is the most valuable of all manures produced by livestock. It has historically been used as a source of plant nutrient and soil amendment. However, in areas of intense poultry production, excess manure represents a waste problem for producers.

In some areas, over-fertilizing pastureland with poultry manure has resulted in groundwater and surface water problems. These problems developed as excess nutrients washed off the land or leached into groundwater supplies.

To obtain the maximum economic value of the plant nutrients in poultry manure and to protect the water supply from excessive nutrient run-off or leaching, apply poultry manure to match the nutrient needs of the crop.

Nutrient Analysis

Two basic types of poultry wastes are produced in Alabama-broiler litter and caged layer manure (Table 1). Broiler litter, for fertilizing purposes, includes all floor-type birds such as broilers, pullets, and floor layers. Some type of bedding or litter material is used on the floor of these houses.

Caged layer manure is free from litter material and generally has a higher moisture content than manure from broiler houses. Both types of waste will contain feathers and some wasted food.

The chemical analysis of either type of manure is highly variable due to several factors. These include

Table 1. Estimation of Poultry Manure Production.

Type Of Poultry	Percent Moisture	Grow-Out Time Interval	Tons Produced Per 1,000 Birds
Broilers	20	6 to 7 weeks	2
Caged Layers	75	1 year	35 to 44

* Based on six grow-out cycles per year on pine shavings or peanut hull bedding.

moisture, temperature, amount and kind of litter, amount of soil picked up in cleaning a house, the number of batches of broilers fed on the litter, and the conditions under which the manure was stored and handled before spreading.

Table 2 shows both the average and range of nutrient composition of broiler litter sampled in Alabama from 1977 through 1987. During this 11-year period, the litter from 147 broiler houses had an average moisture content of 19.7 percent and an average fertilizer content on a dry-weight basis of 3.9 percent N, 3.7 percent P2O5, and 2.5 percent K2O.

Table 2. Nutrient Composition Of Litter (Dry-Weight Basis) From 147 Broiler Houses Sampled In Alabama, 1977-1987.

	Average Analysis (percent)	Range (percent)
Moisture	19.7	15.0 to 39.0
Nitrogen (N)	3.9	2.1 to 6.0
Phosphate (P2O5)	3.7	1.4 to 8.9
Potash (K2O)	2.5	0.8 to 6.2
Calcium (Ca)	2.2	0.8 to 6.1
Magnesium (Mg)	0.5	0.2 to 2.1
Sulfur (S)	0.4	0.01 to 0.8

In 1981, litter from two slat-breeder houses and one pullet house and manure from two high-rise caged layer houses were analyzed for moisture and nitrogen. Results are given in Table 3.

The nitrogen content of litter from the pullet house was only about one-third the nitrogen content of broiler litter (Table 2). The nitrogen content of litter from the slatbreeder house was about half that of broiler litter.

Table 3. Nitrogen Content (Dry-Weight Basis) From HighRise Caged Layer, Pullet, And Slat-Breeder Houses In Cullman County Sampled In July 1981.

Type Of Poultry House	Moisture (percent)	Nitrogen (percent)
Caged Layer *	63.4	1.2**
Pullet	22.0	1.2
Slat Breeder*	16.8	2.1

* An average of two houses.
** The caged layer manure had been accumulating for about 12 months and had lost much of the ammonium nitrogen.

Caged layer manure generally contains about 4 to 7 percent nitrogen if collected at one to three week intervals. However, under high-rise houses where layer manure sometimes accumulates for long periods of time, much of the nitrogen is lost into the air as ammonia. The nitrogen content of the accumulated caged layer manure given in Table 3 was only 1.2 percent.

Moisture is perhaps the single most important variable associated with spreading manure by the ton. Manure from all classes of chickens will average 70 to 77 percent moisture when excreted. However, broiler manure with litter dries under normal house conditions and will average about 20 percent moisture. Caged layer manure will average about 70 percent moisture.

Analyses should be reported on both a dry-weight basis (oven dried) with little moisture and on a wet-weight basis just as the sample was taken. Reporting on a dry-weight basis eliminates the moisture

variable when comparing manur

When spreading manures, the moisture adds weight and can reduce the value of the product in proportion to the moisture present (Table 4). Be sure the value you use when spreading manure by the tone is on a wet-weight basis or just as the manure sample was taken.

Table 4. Estimated Analysis And Value Of Poultry Manure On A Wet-Weight And Dry-Weight Basis (0-Percent Moisture).

Type	Percent Moisture*	Percent Nutrients (N-P2O5-K2O)	Pounds Per Ton (N-P2O5-K2O)	Value Per Ton**
Broiler	20	3.1-3.0-2.0	62-60-40	$33.25
Broiler	Oven-dry	3.9-3.7-2.5	78-74-50	$41.80
Caged layer	70	1.5-1.3-0.5	30-26-10	$14.20
Caged layer	Oven-dry	5.0-4.3-1.7	100-86-34	$47.30

*Use the higher moisture value when buying or spreading manures as it comes from the house.
** Calculations based on N at 25 cents per pound, P2O5 at 20 cents per pound, and K2O at 15 cents per pound.

Nutrient Availability

Poultry manure should be managed for its N value. However, N availability is the most difficult of the three major nutrients to predict. About 25 to 30 percent of the total N in broiler litter is in the urea and ammonium forms (Figure 1). It is readily available for plant uptake just as fertilizer ammonium and fertilizer urea.

When litter analyses are run by a laboratory, the readily available N is reported as ammonium N or NH4-N. Fertilizer urea and manure urea are likely to convert to ammonia gas (NH3) and then to evaporate.

When manure has a strong ammonia odor or is spread on the surface and not incorporated into the soil, significant nitrogen will be lost. As much as 75 percent of the ammonium N (22 percent of total N) could be lost within seven days after spreading if the weather is hot and dry and the manure is not soil-incorporated.

Of course, incorporation is not practical or even desirable in situations such as pastureland or hay fields, and ammonium N loss should be included in the total amount to be applied.

The organic N fraction gradually becomes available for crop uptake as the manure decomposes. Scientists in Virginia estimated that for broiler litter, about 50 percent of the organic N is released during the first year following application, 12 percent within the second, 5 percent during the third, and 2 percent during the fourth.

The percentages would be similar for North Alabama, but decomposition will be somewhat faster when manure is incorporated into the sandy soils of South Alabama. Therefore, the total amount of N available from manure applications is the sum of that available from applications being made at a given time plus that available from previous applications (residual N).

The P and K fractions are considered to be about 75 percent as effective as commercial fertilizers during the year of application. However, manure applications should be based on the N requirement of the crop because excess nitrogen can leach into groundwater or run off into streams, creating environmental concerns. If litter is applied at rates that will supply the N needed by the crop,

adequate P and K are generally available.

Under frequent manure applications, P will build up in Alabama soils to very high levels. Potash may leach in sandy soils and some fertilizer K applications may be necessary to meet the needs of certain crops, particularly hay crops.

Land Application

When applying poultry manure to cropland, pastureland, and hay fields, consider the following.

1) Determine the nutrients in the manure or litter prior to spreading. An analysis by a commercial laboratory would determine exactly how much moisture, ammonia N, organic N, and other plant nutrients are in the sample. This will allow you to calculate the value of the manure and how much to spread. If a chemical analysis is not made, a good estimate of the fertilizer content of litter is as follows: A ton of broiler litter with 20-percent moisture contains 60 pounds of nitrogen, 60 pounds of phosphate, and 40 pounds of potash. However, keep in mind that stored litter can change over time unless it is protected, and an analysis may take as long as two weeks.

2) Determine the nutrients needed by the crop to be grown. Soil testing provides the best estimate of residual P and K in the soil and other soil amendments (e.g., lime) that should be applied for optimum yields and nutrient use efficiency. Recommended N rates are given for each crop on the soil test report. Exceeding the recommended rates by more than 30 percent could result in excessive N leaching in some soils or the potential for surface run-off into streams.

3) Estimate the availability of N in the manure. The calculate a rate of application that is consistent with the requirements from the soil test report (see Circular ANR -244a, "Worksheet For Calculating Poultry Waste").

Other Recommendations

Reducing ammonium odors. To conserve N in poultry manure and to reduce the ammonia odor and associated N loss, apply superphosphate at the rate of 100 pounds per ton of manure in the house. The phosphate will trap the ammonia as ammonium phosphate, and it will increase the fertilizer value of the final litter. Fermentation losses in broiler litter may be reduced by using litter materials which rapidly dry the manure. The most effective means of reducing N losses is to dry the manure in the poultry house.

Adding hydrated lime. Hydrated lime (calcium hydroxide) will help maintain good litter condition and reduce fly problems. However, it will also increase ammonia volatilization and N loss. Do no use it when the ammonia level in the house is high. Use lime at the rate of 50 pounds per 1,000 square feet of floor space.

Outside storage problems. Manure stored outside and exposed to the weather will decompose rapidly. An ashy gray appearance indicates a loss of nutrient value. The N and organic matter will be greatly reduced and K may be lost due to leaching. You get maximum fertilizer value when manure or litter is protected from the weather.

N-use efficiency. Where excess quantities of manure must be disposed of on the land, choose a system to maximize N uptake by a crop. Row crops are poor users of soil N because of limited root systems. Corn or cotton may take up only 50 to 60 percent of the

N applied. Grasses, such as hybrid bermudagrasses, produce large amounts of dry matter and are efficient N users. As much as 90 percent of the applied N could be recovered by a good bermudagrass sod.

Cool-season grasses are not quite as efficient because most of their growth is in the early spring. The mineral N in manure applied in the summer and winter to cool-season crops such as tall fescue may be lost through leaching. Apply manure to crops to maximize N uptake and N-use efficiency. Harvest excess forage frequently to remove the N from the land. These practices will minimize potential surface and groundwater contamination from excess N applied in manure.

CIRCULAR ANR-244

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Tulare County

Disclaimer: *This article is geared towards a Tulare County audience and may not be applicable to other geographical areas.*

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Publ. # NG7-9

Manure as a Fertilizer

Pete Christensen, Ext. Viticulture Specialist and Bill Peacock, Tulare County Farm Advisor

Manure is an excellent fertilizer containing nitrogen, phosphorus, potassium and other nutrients. It also adds organic matter to the soil which may improve soil structure, aeration, soil moisture-holding capacity, and water infiltration.

To determine how much manure is needed, the nutrient content and the rate nitrogen is mineralized (becomes available for plant uptake) needs to be estimated. Actual nutrient content of manures varies depending on source, (the level of protein being fed is more important than even the type of animal - dairy, beef, horse, etc.) moisture content, storage, and handling methods. The following table gives general information of percent moisture, nitrogen (N), phosphorus (P), and potassium (K) content in various manures.

Nutrient Content

The table gives some reported values of nitrogen, phosphorus, and potassium in manures.

	% Moisture	Approximate composition lbs. per ton		% Phosphorus
		Nitrogen	Potassium	
Fresh manure with normal quantity of bedding or litter.				
Dairy	86	11	10	0.55
Hog	87	11	9	0.55
Horse	80	13	10	0.65
Sheep	68	15	8	1.00
Steer, feedlot	75	12	11	0.65
Hen	73	22	10	1.10
Turkey	74	26	10	1.30
Dried commercial products:				
Dairy	16	18	31	0.90

Hog	10	45	20	2.25
Horse	8	14	10	0.70
Sheep	9	27	41	1.35
Steer, feedlot	15	41	38	2.05
Poultry (droppings)	8	83	31	4.15
(with litter)	13	41	23	2.05

**Adapted from Western Fertilizer Handbook, 5th Edition and Fresno County grape pomace analysis survey, 1965 and 1966.*

The nutrient content of manure listed in the table should be used as a general guideline when determining rates of application, keeping in mind the wide variability that exists among samples. Also, application rates must take into accoun mineralization or the rate of release of N as the manure decomposes (see decay series).

Common reasons for the variability of the nitrogen content in manure include type of animal and feed ration, amount of litter, bedding or soil included, and amount of urine concentrated with the manure.

Water content is another major reason for nutrient content variations and should always be considered when buying manure on a per-ton basis. Fresh manures generally contain 70% to 85% water. Air-dried manures will always retain some moisture -- typically around 10% to 15%. As manure dries, the nutrients not only concentrate on a weight basis, but also on a volume basis due to structural changes (settling) of the manure. Volatilization of urine nitrogen can result in considerable loss of nitrogen, up to 50% or more of the total nitrogen.

Generally, dry manure contains 2 to 3 cubic yards per ton; 2.5 cubic yards per ton is a typical figure used for dry poultry and steer manures but must be adjusted with higher moisture contents.

Handling Manure

Handling can greatly alter the value of manure, particularly its nitrogen content. Nitrogen is present in manure in a variety of forms, most of which gradually converts to ammonium and nitrate nitrogen.

The ammonium form can be lost to the air and the nitrates leached by rainfall. Ammonium losses can be minimized by no stockpiling manure while it is moist, minimizing its handling, and discing it under immediately after spreading. Such effects are demonstrated in the following chart.

Manure source	History	Nutrient composition	
		Nitrogen %	Potassium %
Droppings	Prompt drying	4.2	2.5
Center of moist stockpile	Enzyme hydrolysis and volatilization of ammonia	2.1	2.5
Outside of stockpile	Leaching by rain, enzyme hydrolysis, and volatilization of ammonia	1.8	1.6

**From Rackman et al. (1965)*

Some ammonia can be lost to the air [illegible]h time manure is moved or hauled. M[illegible]of the loss is from hydrolysis of the NH_2 groups (enzymatic) and then volatilization of N_20 and NH_3. This loss can be very high when spreading manure, especially during warm, dry weather. Here, at least 50% of the ammonium nitrogen can be lost within 12 hours. Studies have also shown that, by one week after spreading, almost 100% of the ammonium nitrogen can be lost. This loss can represent up to 50% of the total nitrogen available in stockpiled manure.

Thus, the importance if discing in manure **immediately** after spreading is obvious.

Nutrient Availability and Manure Application

Manure is a source of many nutrients including: nitrogen, phosphorus, potassium and man others. However, nitrogen is often the main nutrient of concern for most crops.

Potassium deficiency is usually quite localized within a field and would not be corrected with common rates of manure. However, some improvement might be expected with high rates above 10 tons per acre. The high rates needed to correct potassium (K) deficiency would supply an excess amount of nitrogen for many crops, and this should be avoided.

Rates of Manure for Nitrogen Needs

The nitrogen compounds in manure are eventually converted to the available nitrate form. Nitrate is soluble and is moved into the root zone with water. It is the same form ultimately available to plants from commercial nitrogen fertilizers.

However, the release of available nitrogen from the complete organic compounds during manure decomposition is very gradual. This slow release of nitrogen is manure's most important asset. It extends nitrogen availability and reduces leaching -- of particular importance in sandy soils.

"Decay series" of nitrogen availability

The nitrogen carry-over from previous years of manuring should always be taken into account in fertilizer programs. This can be done by using a "decay series". This is an estimate of the annual release of nitrogen from manure.

The idea is to first apply enough manure to meet the first year's need of available nitrogen. Decreasing amounts are then applied in following years because of the carry-over organic nitrogen that will be released from previous applications.

If the same rate of manure is applied each year, it is possible for a field originally low in nitrogen to accumulate unnecessarily high levels in successive years.

The calculations of this "decay series" can be complicated and change with year to year variations of soil microbial activity in the field. However, it provides a general idea how to adjust for carry-over nitrogen in manuring.

The nitrogen in poultry manure is in released fastest, as most is the urea or uric acid form, with 90% of nitrogen released in the first year.

Fresh manure which contains both the urine and solid portions and has a large amount of urea or uric acid provides a somewhat slower release rate, with approximately 75% of the total nitrogen released the first year.

An even more gradual nitrogen release can be expected from dry feedlot steer manure, with only 35% of the total nitrogen released the first year.

The following example gives the rates of three manure sources needed to maintain the equivalent rate of 50 lbs nitrogen per acre annually up to 5 years. This is adapted from a "decay series" published by Pratt el al. (1973).

"Decay Series"

Manure Source	Nitrogen Content %	% of Nitrogen released in 1st year	Tons manure/acre required to release 50 lbs of Nitrogen each year Time, years				
			1	2	3	4	5
Chicken (dry)	3.0	90	1.0	0.9	0.9	0.9	0.9
Dairy (fresh)	0.7	75	4.8	4.5	4.4	4.3	4.3
Feedlot, steer (dry)	1.5	35	4.8	3.4	3.0	3.0	2.9

*Based on "decay series" of **chicken** --.90, .10, .05; **dairy** -- .75, .15, .10, .05; and **feedlot** -- .35, .15, .10. 05.*

These figures demonstrate the need to adjust rates with time among the various manure sources, especially feedlot manur with its more gradual nitrogen release.

Other Benefits of Manure

The use of manure helps to maintain the organic matter content of the soil which may improve soil structure and water infiltration. However, manure is quickly decomposed under warm, moist soil conditions. With the manure rates used for most crops, organic matter content in soil is only temporarily increased.

Possible Disadvantages

Weeds... Weed seeds are common in some manures. They may enter the animal with its feed and then pass through the digestive tract, still viable, or they may have come with the litter, or they may have simply blown into the feed yard.

Poultry droppings typically have fewer weed seeds surviving the digestive processes. However, other animal manures may contain numerous viable weed seeds if the original feeds were contaminated. Compositing and stockpiling manures can reduce the number of viable weed seeds.

Salts... Manures commonly contain 4 to 5% soluble salts (dry weight basis) and may run as high as 10%. To illustrate, an application of 5 tons of manure containing 5% salt would add 500 lbs of salt.

Normally, irrigation and rain water will sufficiently leach well-drained soils to prevent damaging salt accumulations. However, one should be cautious with poorly drained soils, soils with existing salinity problems, or unusually high application rates, especially when concentrated near young plants.

Induced zinc deficiency... Zinc deficiency can be induced or increased with repeated high rates of manure, especially on sandy soils.

Moderate or infrequent applications do not normally present a zinc problem. However, growers should be aware of the potential problem, especially with soils and varieties or crops of known susceptibility to zinc deficiency.

Summary

The principal value of manure is its extended availability of nitrogen -- of particular value in the more readily leached sandy soils. Manure is also helpful in improving soil fertility in cut areas from land leveling.

Nutrient content and rate of availabilty varies widely, depending mostly on manure source, handling methods, and water content. Fresh manure which includes both liquid and solid fractions with the least handling and then disced in

immediately after spreading will retain the most nitrogen. A laboratory analysis of the manure for nitrogen content is useful. Be sure to take an accurate sample of the manure (requires a composite of many samples throughout the pile or lagoon).

Generally, poultry manure is highest in nitrogen content, followed by hog, steer, sheep, dairy, and horse manure. Feedlot steer manure requires fairly high rates to meet first-year nitrogen requirements because of its lower nitrogen percent and gradual nitrogen release characteristics.

However, this feature provides for more continued nitrogen availability in succeeding years, allowing for progressively lower annual application rates to meet plant requirements.

Faster nitrogen-release sources, such as poultry manure, require more constant and lower annual rates to maintain nitroge availability.

The possible advantages of organic matter content and disadvantages of weed seed and salt content should be considered in using manure.

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University of California Cooperative Extension - Tulare County
Send comments to: UCCE Tulare County Webmaster
Revised: January 28, 1998

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:	
KELLER et al.	
Serial No.: 10/816,850	Examiner: C. D. Sayala
Filed: April 5, 2004	Art Unit: 1761
For: ENVIRONMENTALLY FRIENDLY GRANULATED POULTRY LITTER FERTILIZER	Atty. Docket No.: 119544-00101

DECLARATION OF FREDERIC T. HEASLEY UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In support of the patentability of the above-identified patent application, I, Frederic T. Heasley of 8587 N. Clear Creek Road, Huntington, IN 46750, declares as follows:

1. I am the President of Heasley Argronomics, Inc., a company dedicated to development, research, manufacturing, and marketing of micronutrient products. The company also performs research and development on crop formulations for argricultural and horticultural uses. I have spent more than three decades with various companies, in various capacities, developing fertilizer formulations, researching nutrient formulation to increase crop yield, managing plants producing fertilizer products, engineering environmental systems for controlling ammonia content in the poultry industry, and researching uses for sulfates and ammonia. I have served as a consultant and manager to many organizations, including as ammoniated fertilizer plant

manager with W. R. Grace, and as product development agronomist with Sims Agriculture. I hold B.S. in agronomy from Ohio State University.

2. I have consulted with Mr. William Keller, the inventor of the U.S. Patent Application Serial No. 10/816,850, and have reviewed the application and the cited references.

3. The fertilizer claimed in the above-identified patent application is currently unique and solves many problems that is associated with current poultry fertilizers. In its original state, raw poultry litter is volatile due to inherent methane and ammonia gases, has a noxious odor, has a high potential for spontaneous combustion, and contains arsenic, pathogens and high levels of phosphorus, all known to be hazardous to human health and the environment. Because of its classification as a hazardous waste by the Environmental Protection Agency (EPA) and reported contamination of ground water, its use in its original form has been banned or heavily restricted in most areas of the U.S.

4. While poultry litter in its raw form contains a nitrogen, it is uncontrollable, because the ammonia continuously evaporates from the raw litter resulting in the offensive odor of the litter. This, in turn, reduces the nitrogen content of the final fertilizer product. This is a major problem with poultry litter processing, as nitrogen content is normally lost as ammonia vapors during its processing. Therefore, due to the ammonia evaporation, the nitrogen content of the raw poultry litter is much higher than that of the final fertilizer product.

5. Additionally, as discuss above, the phosphorus content of poultry litter renders it a major environmental problem. However, because phosphate does not readily evaporate from the raw litter during processing, its content must be eliminated from the final fertilizer product if one wants to reduce phosphorus content.

6. Because nitrogen content is lost through poultry litter processing while phosphorus content remains the same. The usual final product generally contains a nitrogen content much lower than that of the raw poultry litter, while the phosphorus content remains similar to that of the raw poultry litter. Any attempt in lowering the phosphorus content of the final product still does not replace the lost nitrogen.

7. The product claimed in the above-identified patent application resolves both problems of fertilizer manufacturing, namely 1) maintaining the nitrogen content in the final fertilizer product; and at the same time 2) lowering the phosphorus content of final fertilizer product. This accomplishment is not taught in any of the cited references. Additionally, this is in contrary to and unexpected from the present understanding and state of the art where the nitrogen is lowered and the phosphorus remains the same after poultry litter processing.

8. The current claims of a final fertilizer product having about 1-2.5 % nitrogen and 0.35% phosphorus clearly shows minimal decrease of nitrogen content with a substantial decrease of phosphorus when compared to the raw poultry litter (see Table I of the specification). Any assertion that these nitrogen and phosphorus contents are inherent from contents of raw poultry litter is erroneous because nitrogen is usually lost during poultry litter processing, as discussed above.

9. Additionally, the allegation that one of ordinary skill in the art would have been able to produce the claimed invention is also erroneous. Certainly, one skilled in the art could assay the soil to determine the soil nutrient contents and crop needs; however, from the teaching of the prior art, one of ordinary skill in the art by varying the ratio of the components could not have achieved the results claimed by the above-identified patent application because of the problems of ammonia evaporation and phosphate persistence in the raw poultry litter. If one wants to

lower the phosphate content by adding less litter and more of the other components, the nitrogen content would also decrease accordingly. The prior art does not teach how to maintain the nitrogen content at a high level, while at the same time, reducing the phosphorus content.

10. Additionally, in any consideration of soil deficiencies and crop nutrient needs, it is always desirable to increase the phosphorus content as it is a nutrient used by the crops. This, however, is contrary to the invention of the above-identified patent application where the phosphorus content is actually reduced. A final phosphorus content of 0.35% is not possible if phosphorus is to be added to the raw poultry litter during processing.

11. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001, and that such willful false statements may jeopardize the validity of the application of any patent issued thereon.

Date: JAN 9, 2007

Frederic T. Heasley